REMARKS

Claims 1-7 are currently pending in this application.

At pages 2-3 of the Office Action, the rejection of claims 1-7 under 35 U.S.C. §103(a) as being obvious over Kim et al., "Ion-Specific Aggregation in Conjugated Polymers: Highly Sensitive and Selective Fluorescent Ion Chemosensors", *Angew. Chem. Int. Ed.* (2000) 39, No. 21, 3868-3872, in view of Naemura et al., "Temperature Dependent Reversal of Enantiomer Selectivity in the Complexation of Optically Active Phenolic Crown Ethers with Chiral Amines", Chem. Commun. (1996) 2749-2750, has been maintained.

The Office Action alleges that Kim et al. discloses a fluorescent molecular wire comprising a polymer main chain having a linked conjugated system to which an optically active substituent is linked (equations 1-3, page 3869, col. 1). The Office Action acknowledges that Kim et al. does not disclose the optically active substituent represented by formula (I).

The Office Action contends that Naemura et al. discloses the optically active substituent that is linked to the polymer of formula (III) (equation 4; page 2749, col. 2). The Office Action alleges that Scheme 3 of Naemura et al. shows the crown ether substituent of Applicants' formula (III) is linked to the aromatic ring via an azo system, where there is a delocalization of the pi-electrons (Scheme 3, page 2749). The Office Action contends that it would have been obvious to one having ordinary skill in the art to link said substituent to any number of aromatic systems, including the polymer chains of Kim et al. (claims 1-7), and that it would have been obvious to one having ordinary skill in the art at the time of the invention to use the optically active substituent of Naemura et al. in the fluorescent molecular wire of Kim et al. because it is an obvious variation of the optically active substituent of Kim et al., wherein both substituents are capable of sensing chiral compounds or metal ions.

The Office Action has the following observations regarding the arguments made in Applicants' last response. The Office Action notes that, on pages 8 and 9 of Applicants' arguments, it is stated that the optically active phenolic crown of Naemura et al. does not act as a chemosensor, particularly a chirality sensor. The Office Action contends that Naemura et al., at page 2750, col. 1, discloses that the crown molecule bonds to enantiomers for the prediction of chirality. Also, the Office Action notes that Applicants

argue that it would not have been obvious to conjugate the phenolic crown of Naemura et al. with the polymer of Kim et al. The Office Action refers to page 3868, col. 2, of the Kim et al. reference, where allegedly it is disclosed that an expansive range of conjugated polymers act as a backbone for chemical sensors, allegedly making it obvious to one having ordinary skill in the art to combine the optically active element with such a polymer.

Applicants respectfully traverse the §103(a) rejection and request that the rejection be reconsidered and withdrawn.

As reiterated by the Supreme Court in *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. ___, 82 U.S.P.Q.2d 1385 (2007), the framework for the objective analysis for determining obviousness under 35 U.S.C. §103 is stated in *Graham v. John Deere*. Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in *KSR International Co. v. Teleflex Inc.*, 72 Fed. Reg., No. 195 (October 10, 2007) at page 57527 (hereinafter "Examination Guidelines"). The factual inquiries enunciated by the Court are as follows:

(1) Determining the scope and content of the prior art;

(2) Ascertaining the differences between the claimed invention and the prior art; and

(3) Resolving the level of ordinary skill in the pertinent art.

Examination Guidelines at page 57527.

The Office Action appears to misunderstand not only the feature of the present invention but also the cited reference. In particular, the Office Action appears to just select convenient words from the cited references to construct an assertion without considering the true meaning of the wording of the cited reference.

The feature of the present invention is that the optically active substituent (i.e., the receptor site) is linked to the polymer main chain and is conjugated with the polymer main chain. By this feature, the excitation energy can move freely within an effective conjugated chain in the fluorescent molecular wire molecule. Since the wire molecule has multiple receptor sites, when the target is bound to any given portion of the receptor sites, the electronic state of the effective conjugated chain is changed. That is, whichever receptor site within the effective conjugated chain the target is bound to, an electrical or optical response can be obtained. Therefore, a high sensitivity that conventional low molecular weight

sensors could not attain can be achieved. In addition, the fluorescent molecular wire of the present invention has not only higher detection sensitivity but also improved chirality recognition ability for a primary amine when compared to monomeric compounds having the same structure as a substituent and having high chirality recognition ability.

As shown in Scheme 1 on page 3870 in Kim et al., although the conjugated polymer of Kim et al. has plural receptor sites, the feature of the conjugated polymer is that the conjugated polymers aggregate when the targets bind to the receptors thereof. Kim et al. measures the change of the spectrum due to the aggregation. That is, the change at the receptor site (substituent) is not necessary to be transmitted to the conjugated polymer chain. Therefore, the conjugated polymer of Kim et al. does not require the conjugation between the crown ether and the polymer main chain.

In section 8 of Response to Arguments in the final Office Action, the Office Action asserted that Kim et al. discloses an expansive range of conjugated polymers act as a backbone for chemical sensors. However, this assertion is incorrect. In the indicated portion of Kim et al., that is, on page 3868, col. 2, Kim et al. merely describes that an expansive range of structure to be used as a chemical sensor is known, and thus the facile tuning of properties by modification of the polymer backbone or the introduction of a side group is possible. This description is just a common knowledge. Kim et al. does not describe conjugation between a polymer main chain and optically active substituent. On the contrary, it is important for the conjugated polymer of Kim et al. to increase a. sensitivity of the conjugated polymer when the polymer main chains aggregate. This event of Kim et al. is caused between plural molecules, which are totally different from the conjugation within one molecule of the present invention.

In section 6 of Claim Rejections in the final Office Action, the Office Action asserted that Naemura et al. discloses that the crown ether substituent of formula (III) is linked to the aromatic ring via an azo system, where there is a delocalization of π-electrons. This assertion is correct. However, even if the crown ether of Naemura et al. is used as a receptor site of the conjugated polymer of Kim et al., there is no teaching or suggestion in Naemura et al. that it is better that the portion where π-electrons are delocalized is extended. Furthermore in view of the amplification of sensitivity due to an aggregation in the

conjugated polymer of Kim et al., the receptor site does not require to conjugate with the polymer main chain.

In addition, the Office Action asserted in the Response to Arguments (section 8) of the final Office Action that Naemura et al. describes on page 2750 that the crown molecule bonds to enantiomers for the prediction of chirality. However, the Office Action's assertion is incorrect. Naemura et al. describes that "the extrapolation predicts that the chirality of the enantiomer will change at about 60°C". This description merely indicates that the enantiomer selectivity can be changed in a temperature dependent manner in the complexation of optically active phenolic crown ethers with chiral amines.

Therefore, one having ordinary skilled in the art would not have been motivated to conjugate the optically active phenolic crown ether of Naemura et al. with the fluorescent molecular wire of Kim et al. Furthermore, one having ordinary skilled in the art would not expect that the chirality recognition ability for a primary amine would be improved by introducing the crown ether of Naemura et al. to the fluorescent molecular wire of Kim et al. Accordingly, Applicants respectfully request reconsideration and withdrawal of the §103 rejection of claims 1-7.

Reconsideration of the rejections and allowance of pending claims 1-7 are respectfully requested. The undersigned respectfully requests that the Examiner contact her with any questions regarding this Amendment, in an effort to move this case towards allowance.

Respectfully submitted,
THE WEBB LAW FIRM

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